

PATENT SPECIFICATION

886,531



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International Classification:—B65b, B31b, B65d.

COMPLETE SPECIFICATION

DRAWINGS ATTACHED

Improvements in or relating to Packing Apparatus

I, KURT OTT, trading as HARBA-WERK, WILHELM F. OTT, of 26, Eschollbruecker Strasse, Darmstadt 2, Germany; a German national, do hereby declare the invention, for 5 which I pray that a patent may be granted to me, and the method by which it is to be performed, to be particularly described in and by the following statement:—

The present invention concerns apparatus 10 for packing substances by folding a web of paper (or the like foldable material) coated with a thermoplastic material or similar synthetic material.

Hitherto substances, such as coconut oil 15 and the like, had to be set in special moulds and, subsequently, they were packed in greaseproof paper or the like. The packings or packages of the present invention are to be produced in form of so-called series 20 packings. Drawn or embossed series packings for tablets and so forth are known per se which are of universally ductile paper, sheet metal, synthetic materials or synthetic material foils. Moreover, it has also been 25 proposed to form series packings by permanent deformation of plastic material.

According to the present invention an apparatus for forming containers from a continuous web of paper or other material, fill- 30 ing and sealing them, comprises in sequence, cutting and creasing devices for making cuts and fold lines in the web, shaping matrices arranged to be advanced with the web, at least one press ram to shape the package, 35 adapted to force a portion of the web into one of the shaping matrices, in conjunction with a holding ram, lateral shaping plates for folding up the sides of the container held in a matrix by the first ram, filling means for 40 filling each shaped container with the desired contents, sealing devices for sealing a con-

tinuous cover web to the peripheral flanges of the open top of the filled container and devices for severing each of the filled and sealed containers from the web and for fold- 45 ing over said peripheral flanges to form the final shape of the individual package.

Thus there is obtained an accurately operating machine, which at high operating speeds allows folded individual packings to 50 be produced without subjecting the material, i.e. the web, to strain. The packings produced by this machine replace cardboard packings having separate lids or when using internal linings of synthetic material also re- 55 place tin packings.

These packings may be used not only for packing frozen materials such as fish, meat, fruit, vegetables, substances which set when cooled such as, for example, coconut fat, but 60 also fish preserves such as sardines in oil or the like, or paste-like, semi-solid and powdery filling materials and among the other things dry pastry, creamed cheese, cheese, butter and so forth. 65

The invention will be described further, by way of example, with reference to the accompanying drawings, in which:—

Fig. 1 is a view of a flat web after being cut to shape; 70

Fig. 2 is a diagrammatic view of a container before folding the side walls inwardly;

Fig. 3 is a further diagrammatic view of a completely folded container;

Fig. 4 is a diagrammatic view of a container after being filled with the cover web thereon but with the corner gussets not yet folded over; 75

Fig. 5 is a perspective view of a completed packing; 80

Fig. 6 is a side elevation to Fig. 5;

Fig. 7 is a diagrammatic side elevation of

[Price 4s. 6d.]

a device for folding the filling spaces;

Fig. 8 is a part elevation of Fig. 7 viewed from A, showing the ram on its downward path;

5 Fig. 9 is a diagrammatic side elevation of the part of the apparatus adjoining Fig. 7, adapted to close and complete the packings;

Fig. 10 is a schematic perspective view of another embodiment for producing the
10 packings on a separate conveyor belt;

Fig. 11 is a fragmentary schematic perspective view of a device for completing the packings, which directly adjoins that of Fig. 10;

15 Fig. 12 is a diagrammatic side elevation of a filling position of the apparatus;

Fig. 13 is a partial plan view of Fig. 12;

Fig. 14 is a perspective view of packings still attached to one another and having a
20 rapping thread;

Fig. 15 is a perspective view of a packing with ripping thread ready for sale;

Fig. 16 is a plan view of an apparatus for inserting the ripping thread;

25 Fig. 17 is a plan view of an alternative embodiment of the blanked out web;

Fig. 18 is a diagrammatic view of the first folding stage of a container as shown in Fig. 17;

30 Fig. 19 is a diagrammatic view of a completely folded container as shown in Fig. 17;

Fig. 20 is a diagrammatic view of a container with cover sheet corresponding to Fig. 19;

35 Fig. 21 is a diagrammatic view of the filled container as shown in Fig. 20 after the first closure stage; and

Fig. 22 is a diagrammatic view of a completed packing of the type shown in Fig. 20.

40 A roll of paper is denoted by the numeral 1 (Fig. 7). This paper has on the upper surface a coating or a foil layer of thermoplastic material. By way of rollers 2 the paper is drawn from the roll 1 as a web and fed to a
45 cutting station. This comprises a supporting plate 3 and stamping or cutting knife pairs 4, 4a which carry out cutting movements in a vertical direction. The web is held down over the supporting plate 3 by means of endless conveyor belt 5. In this cutting station
50 the shaped stampings and incisions are performed therein at regular intervals.

After being cut to shape, the web arrives at a folding station II. In this position the
55 container shapes shown, for example, in Figs. 2 and 3 are formed by folding.

For this purpose there are matrices joined in a chain-like manner, which serve as lower
60 moulds 6, which in the direction of movement have at the front and the rear shaping blocks 7, 8. These shaping blocks are open on both outer sides. Portions of the web are forced into any matrix 6, 7, 8 of the first chain by means of a press ram 9. In order
65 to prevent the web from being damaged

when folding in a U-shaped manner, the front edge 10 of the pressing ram 9 is spring-mounted. It is possible for this front end 10 to be resiliently mounted by way of bolts 11 and vertically adjustable between brackets 70 13, 13a of the pressing ram 9 by interposition of springs 12. The front portion 10 herewith first presses the web down and then pulls it forwardly to the corresponding length thus forming the front edge of the packing 75 against the cross member 8, whereupon the non-resiliently mounted part of the pressing ram 9 follows the movement to form the rear edge against cross member 7. During this movement of ram 9, lateral shaping plates 80 14, 14a (Fig. 8), are swung vertically upwards whereby the side walls 17 of the packings are folded upwardly whilst simultaneously forming corner panels 16 (Fig. 3). The lateral shaping plates 14, 14a are swung by a bridge piece 94 (carried by ram 9) which abuts links 95 to swing the lateral shaping plates 14, 14a into position, although other mechanical arrangements are possible. The lateral shaping plates 14, 14a may be so
90 dimensioned that the upper edges 92 are spaced by the thickness of paper from the outwardly stepped upper portion 9a and the bracket 13 of the pressing ram 9. Thus there is formed flanges 18 folded outwardly between the upper edges 92 of the plates 14, 14a and the outward step portions of 9a and 13. When using thermo-plastically coated paper, it is possible for the lateral
95 shaping plates to be heated to cause the corner panels to be welded together, only in the region of the front and rear blocks of the sides of the matrix by means of which there is created a container welded together at all four corners. After completing one of the linked containers it is held against distortion during the formation of the next container by a holding ram 9b and they arrive after passing a holding-down device 19 at a filling position III (see Fig. 7). Here they
100 are charged with the filling material by a known filling device not shown, whereupon the material is levelled from above by a holding-down device, such as a ram 20. Subsequent to this the packings arrive at a
105 cooling zone (not shown).

The web of material is progressively fed and the matrix chain 6 is advanced progressively in synchronism with the different fixed apparatus such as the cutting and folding station and stop devices. The corresponding control devices are of a kind known per se and not shown in the drawings. It is possible for the stamping or cutting knives, the shaping and holding rams 9 and 9b respectively to be moved up and down by means of pneumatic, hydraulic or mechanical means by way of cam discs. This control is effected positively in synchronism with the driving wheels connected in series with
110 115 120 125 130

the matrix chain.

When the filling material has been set in the individual containers, a continuous cover web 22 (see Fig. 9—position IV) is unwound 5 from a roller 21 and fed underneath an endless conveyor belt 23 acting as a holding-down device. In the sealing station IV a ram 24 is pressed thereon which is provided with a welding ledge 25 extending therearound 10 corresponding to the packing, which ledge is heated in known manner and when applied to the upper cover web welds the same to the flanges 18 of the containers, which are supported by the cross members 47a and 15 lateral support members 48 and 49.

If necessary, it is possible for heating jaws or the like, which in certain circumstances may be energised by a high frequency heating arrangement to be followed by cooling rollers or the like, in order to obtain a better connection at the welding points by cooling under pressure.

After being sealed, the packings leave the matrix chain 6 and are transferred to a guide track 26 and the longitudinal flanges are trimmed by means of a trimming roller 93 prior to station V. In station V the chain of continuous packages are divided into separate articles by means of punch 27, and the 30 projecting flanges are folded against the longitudinal sides by means of the same punch 27. The side flaps 28 flatten the welded triangles 16 against the packing body. On an inclined track 31 the completed packing 32 leaves the machine and slides into a collecting container. Roller 93 also assists in advancing the packages.

In the further embodiment shown in Figs. 10 and 11 the paper web 1a after leaving the 40 cutting position I, which comprises the punch or cutting knife, arrives at a folding position II in which it is deformed in continuous operation in the shape of containers open at the top. The matrices adapted to the desired 45 shape and size of the packing are linked chain-like together, viz. these consist also of a base plate 6 and a front block 8 and a rear block 7, which together with the base plate 6 is connected into the hinge 6a of the chain. 50 Into these matrices 6, 7, 8 the web is pressed by means of a press ram 9 in conjunction with a holding ram 9b (shown schematically in Figs. 10 and 11) in the afore-described manner, thereby forming the series of joined 55 individual containers as before. In this embodiment however the lateral shaping plates 14, 14a are pivotally fixed to the base plate 6.

The chain with the shaping matrices 6, 7, 60 8 which is led over two guide wheels 40, 41, instead of continuing through all the working positions as in Fig. 7, is followed by way of a chute 42, conveyor belt or the like adapted to forward the preshaped series 65 packings P by a further endless conveyor

belt, as is shown in Fig. 11. Within the region of the chute 42 or the like there is the filling position (not shown), after which there may be connected in circumstances drying or cooling zones (not shown).

As shown by Fig. 11, the second endless matrix chain comprises the two guide wheels 43, 44 and the chain links each comprising a base plate 45 with the chain hinge 46. These links are each fitted above the hinge 75 46 of the chain with a shaping plate 47, which at either end extends only partly over the width of the base plate 45. The packings filled in the previous position are sealed in this position IV. 80

To seal the packing, similar to the arrangement shown in Fig. 9, a web 22 fed from a roller 21 after being led underneath a guide conveyor belt 23 is passed over the filled packings, whereupon by means of the 85 ram 24, which may be fitted with a welding ledge (not shown) or the like, the web 22 placed thereon is welded at the edges thereof to the flanges of the packings, such flanges being supported during this operation by the 90 side members 47, 48 and 49.

In the next position V the row of packings P₁ diverted from the chain 43-47 by way of a slide track, which have been sealed on top by means of the continuous cover web 22, 95 are completed. This position substantially comprises a lower punch 52 which co-operates with an upper punch 53. By means of these punches the sealed flanges projecting on all sides are trimmed and folded downwards, whereupon the completed packing 32 leaves the machine on a chute 31. 100

Referring now to the filling position III, shown schematically in Fig. 7, and in more 105 detail in Figs. 12 and 13 in order to keep the sealing surfaces perfectly clean when charging the materials to be packed, an endless cover band 140 is used. The links of the matrix chain which are fitted with lateral 110 shaping plates 14 and 14a are denoted by the numeral 6. Within the hollow spaces formed by the matrix there is the completely folded packing P, from which the flanges project horizontally on all sides.

In the region of the filling position III 115 there is provided the revolving cover band 140 which is led around guide rollers 141. The numeral 142 denotes a washing chamber and the numeral 143 a drying chamber. The cover band is provided on the upper 120 surface with cut-outs 144 which are somewhat smaller than the cross sectional area of the upper filling space of the container. When charging the commodity or the material to be filled, the edges surrounding the 125 filling space area 144 of the band 140 are covered to a greater or lesser extent to suit the consistency of the material and to prevent the filling material from getting on the sealing surfaces of the packing. 130

After the filling operation, the cover band is conveyed upwardly into the washing chamber where the band is cleaned again by means of nozzles 145 for the band 140 to be returned after passing through a drying chamber 143 on to the upper surface of the chain 6. One of the rollers 141 is adapted as a driving roller by means of which the band is advanced at a speed corresponding to the speed of the chain 6.

The heating blocks, shown in the drawings and intended for welding the corner flaps and cover sheet, may be energised by means of known high frequency heating apparatus. In order to allow the completed and filled container, sealed with the cover web, to be readily opened it is possible for a ripping thread to be secured by sealing it diagonally (as seen from above—see Fig. 14) beneath the cover web between the flanges to be sealed with one another.

Figs. 14 and 15 show packings. The tearing thread 60 is welded in diagonally over the filling area across the edges 18. The individual packings on sale, in addition to the end 61 of the thread secured in the edge 18, are provided with indentations 62 in order to allow the end 61 of the thread to be seized after tearing the edge.

The insertion of such tearing threads is effected when the packings are still connected before sealing the cover web i.e. between stations III and IV, in zig-zag shape (Fig. 14) by way of an apparatus shown in Fig. 16.

A pivoted lever 63, at the free end 64 of which a thread 60 is threaded unwound from a bobbin (not shown), has at 65 a pivot and may be swung to and fro by way of a lever 66. The lever 66 is pivotally mounted at 67 on a supporting arm 68. The long end is linked with the pivoted lever 63 by way of a slot 69. The other lever end is in sliding contact with a cam disc 71 by way of a control roller 70, the drive of the cam disc being effected by way of a control wheel 72 and driving belt 73 from the drive shaft 74.

An alternative method of forming the corner fold using a packing blank as shown in Fig. 17 is illustrated in Figs. 18-22. The lateral edges 81 and 82 of the rear and front sides of the packing are folded as before and, whilst upwardly folding the side walls 84, the two corner panels 85, 86 are so placed one upon the other about the outer folding line 87 that the corners formed hereby extend in extension of the side walls 84. The flange 83 is immediately adjoined by end portions 88 and over one of these end portions there is placed the flange 81 with interposition of a small corner fold 89. The small corner panel 89 is formed by the folding line 90 which extends from the lateral border 91 of the side wall to beyond the edge of the flange 81, as shown in Fig. 18.

If it is assumed that in Fig. 17 the upper

surface and hence, with the completed packing, the inner surface is provided with a thermoplastic layer, then when heat-sealing the corner panels 85, 86 and the flanges 83, 81, 82 and the end portions 88 the heat-sealable layers are caused to be applied face to face at the bent-over edge in the region of the small edge panels 89 and that when applying a cover sheet 22, the underside of which is provided with a heat-sealable layer, the whole upper edge is sealed all around over the whole circumference by welding the heat-sealable layers facing one another.

If a package, as described above, has been sealed at the edges on all sides with the cover sheet 22, then in a further operation the projecting flanges 83, together with the other opposing flanges 81 and 82 which overlie them, are folded over downwardly against the sides 84. The end portions 88 of flanges 83 are then folded inwardly across the front and rear sides of the packing together with the corner flaps 85 and 86, along folding lines which reduce the flanges 81, 82 to triangles as shown in Fig. 22. The flanges 81 and 82 are folded over the front and rear sides at the same time.

It is possible to use any of the known desired mechanical devices for carrying out these foldings, as mentioned before.

In place of the chain-like connected matrices 6, 7, 8 it is also possible within the scope of the invention for each of the matrices to comprise two end blocks joined at a fixed distance from one another and carried on slide tracks. To reduce the friction it is convenient for the shaping bodies to bear on the slide tracks by way of rollers or the like.

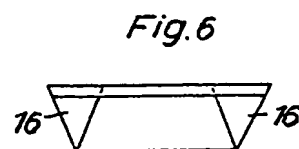
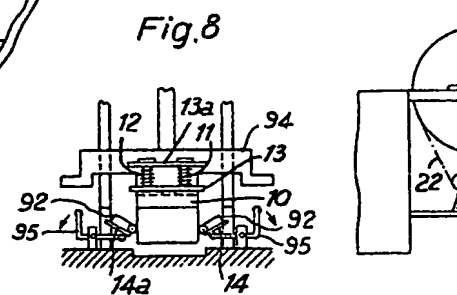
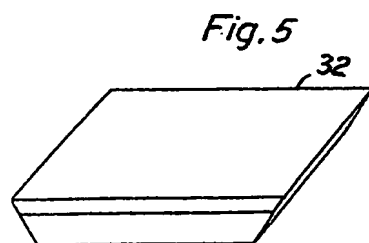
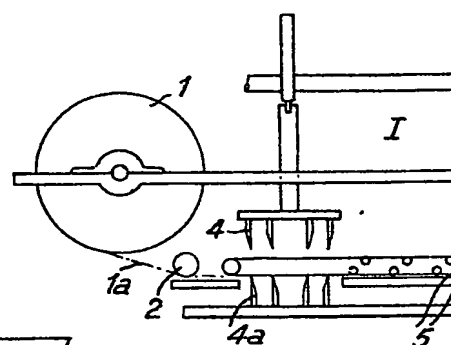
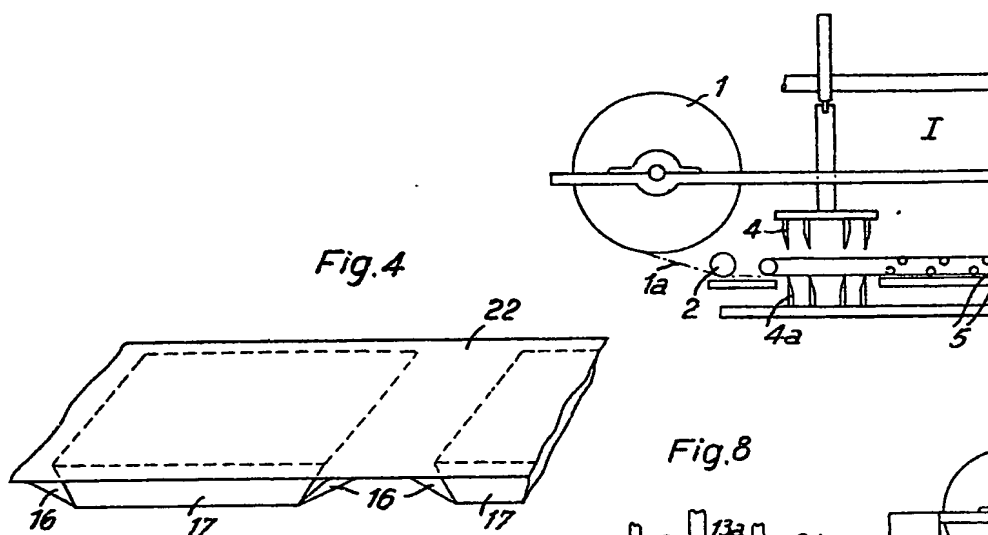
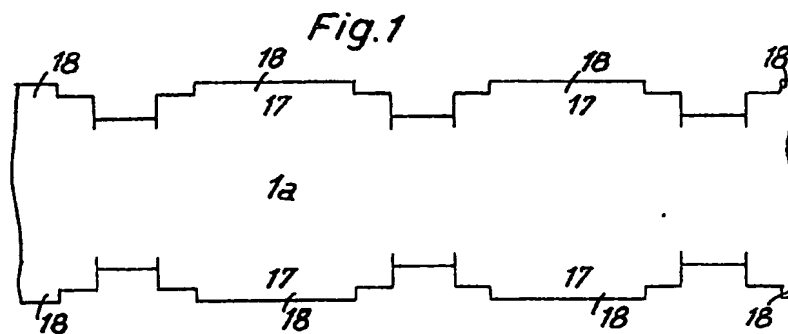
If a zig-zag-shaped inserted ripping thread is not desired, it is possible for continuous longitudinally extending tearing threads to be fixed between the cover web and the lateral end edges.

WHAT I CLAIM IS:—

1. An apparatus for forming containers from a continuous web of paper or other foldable material, filling and sealing them, comprising, in sequence, cutting devices for making cuts in the web, shaping matrices adapted to be advanced with the web, at least one press ram to form the container, adapted to force the web into the shaping matrices in conjunction with lateral shaping plates adapted to fold up the sides of the container held in the matrix by the press ram, filling means for filling each container with contents, sealing devices for feeding and sealing a continuous cover web onto the peripheral flanges of the open top of each of the filled containers and devices for severing each of the sealed and filled containers from the web and for folding over the peripheral flanges to form the final shape of the individual package.

2. An apparatus as claimed in claim 1 in which the web is intermittently advanced past the devices acting thereon, each pre-folded container being held against distortion by a holding ram at a container shaping station and having a further ram which presses down the material charged into the container at the filling station.
3. An apparatus as claimed in claim 1 or 2 in which the press ram for shaping the container has a resiliently mounted part which engages the web to form the front side of the container prior to the engagement of the remaining part of the ram with the web.
4. An apparatus as claimed in claim 3 in which the press ram is of stepped form on all sides to provide surfaces for folding the outwardly extending flanges on the sides and ends of the container.
5. An apparatus as claimed in any one of the preceding claims in which the lateral shaping plates for folding the flanges of a container are pivotally mounted on opposite sides of the matrix to cooperate with the press ram for shaping the container.
6. An apparatus as claimed in claim 5 in which the lateral shaping plates are adapted to be heated to serve as heating devices for heat sealing together overlying folded parts at the corners of the package.
7. An apparatus as claimed in claim 6 in which the lateral shaping plates serve as heating devices only in the region of the front and rear wall forming sides of the matrix.
8. An apparatus as claimed in claim 1 in which the matrices are in the form of a continuous chain advancing beneath the pressing ram, said pressing ram being succeeded by a holding ram, and is prior to feeding the still joined shaped containers to a chute which after the containers have been filled delivers them to a second chain of matrices having shaping plates which support the containers whilst they are being sealed, which second chain is followed by a further chute delivering the packages to a position for finishing the individual packages.
9. An apparatus as claimed in any one of the preceding claims in which a cover strip of rubber or other washable material and having apertures through which the containers can be charged is arranged to move with the web of packages in synchronism with the movement of the matrices.
10. An apparatus as claimed in claim 9 in which the cover strip after travelling with the web of packages is passed through a washing and drying chamber.
11. An apparatus as claimed in claim 9 or 10 in which a device for inserting a tearing thread between the package web and the cover web is caused to move in zig-zag fashion so as to lay the thread along a zig-zag path across the open upper side of the charged containers before they are sealed.
12. A package produced by the apparatus as claimed in any of the preceding claims comprising a container stamped from a continuous web and having triangular corner gussets and longitudinally outwardly extending flanges to which a cover web is subsequently sealed after the container has been filled, the corner flaps and the flanges being folded thereafter to lie flat against the sides of the container.
13. A package as claimed in claim 12 in which the two longitudinally outwardly extending flanges are first folded against the sides of the container and subsequently the two laterally outwardly extending remaining flanges are folded down over the inwardly folded corner gussets.
14. A package as claimed in claim 12 or 13 including a tearing thread disposed between the edges of the package and the cover web across the charge of material in the package.
15. An apparatus constructed and arranged to operate substantially as herein described with reference to and as illustrated in Figs. 7, 8, 9, 12 and 13, of the accompanying drawings.
16. An apparatus constructed and arranged to operate substantially as herein described with reference to and as illustrated in Figs. 10, 11, 12 and 13 of the accompanying drawings.
17. A package constructed substantially as herein described with reference to and as illustrated in Figs. 1 to 5, and 14 of the accompanying drawings.
18. A package constructed substantially as herein described with reference to and as illustrated in Figs. 17 to 22 of the accompanying drawings.

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6 SHEETS

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SHEET 1

18
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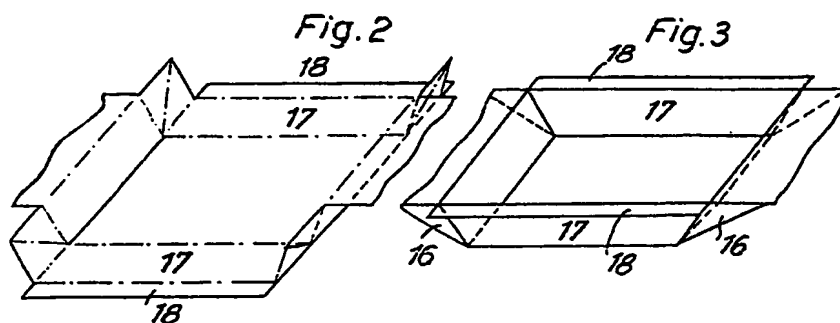
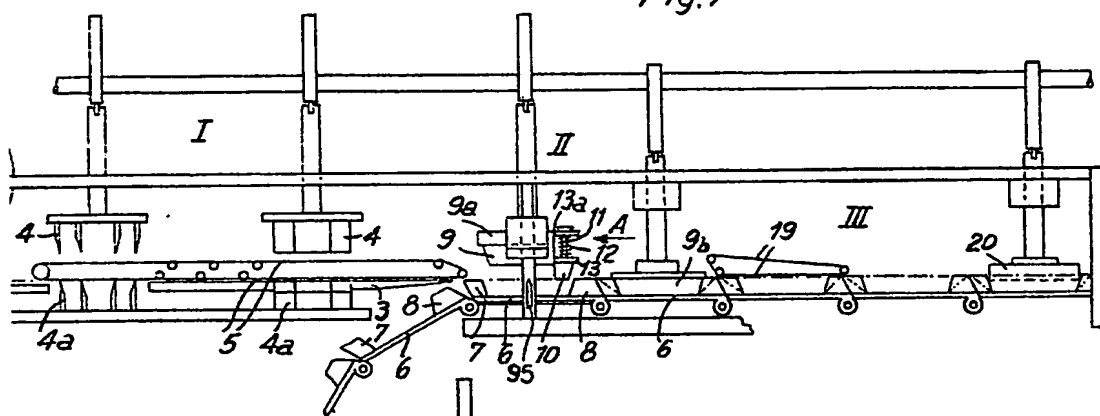
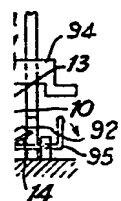


Fig. 7



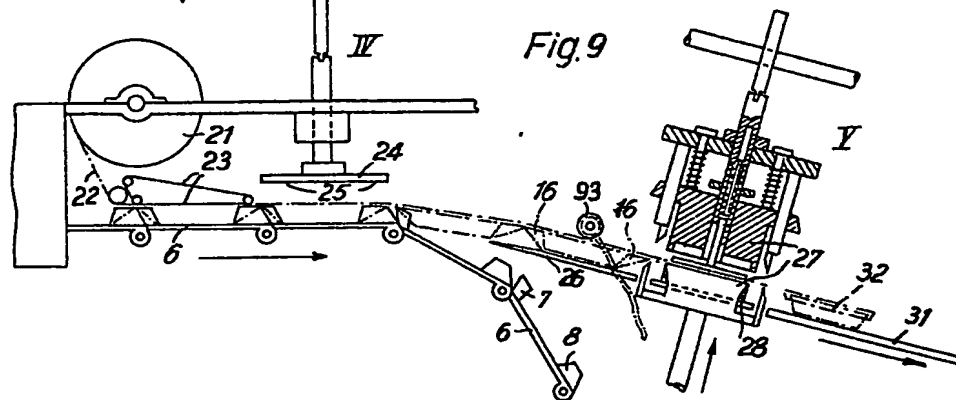
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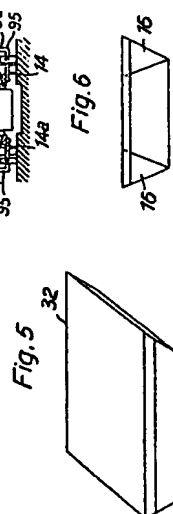
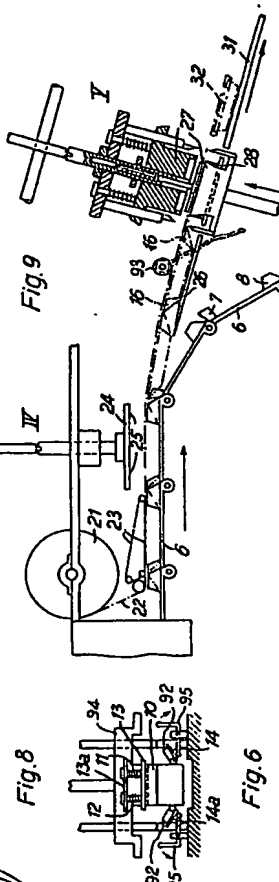
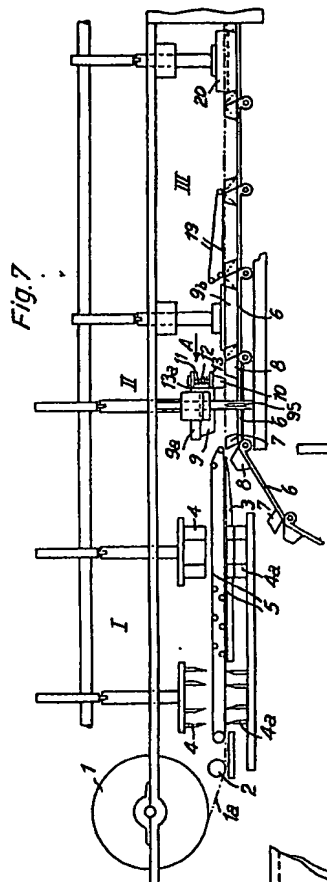
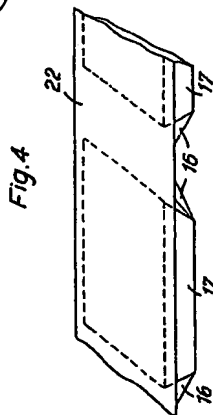
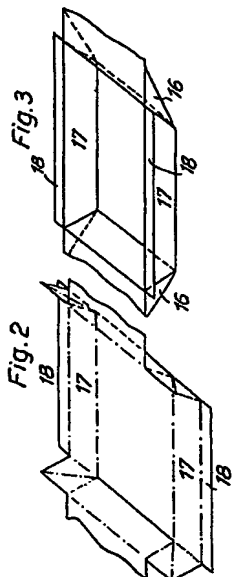
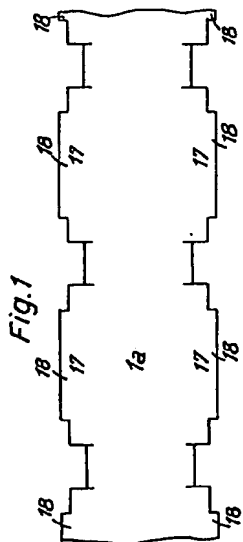


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Fig. 9





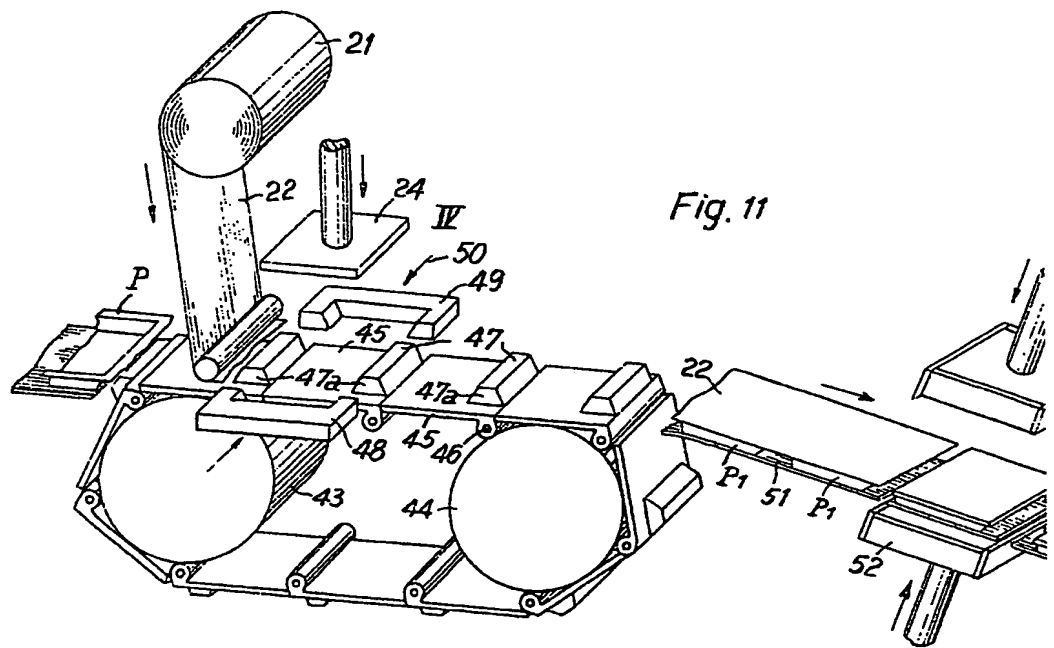
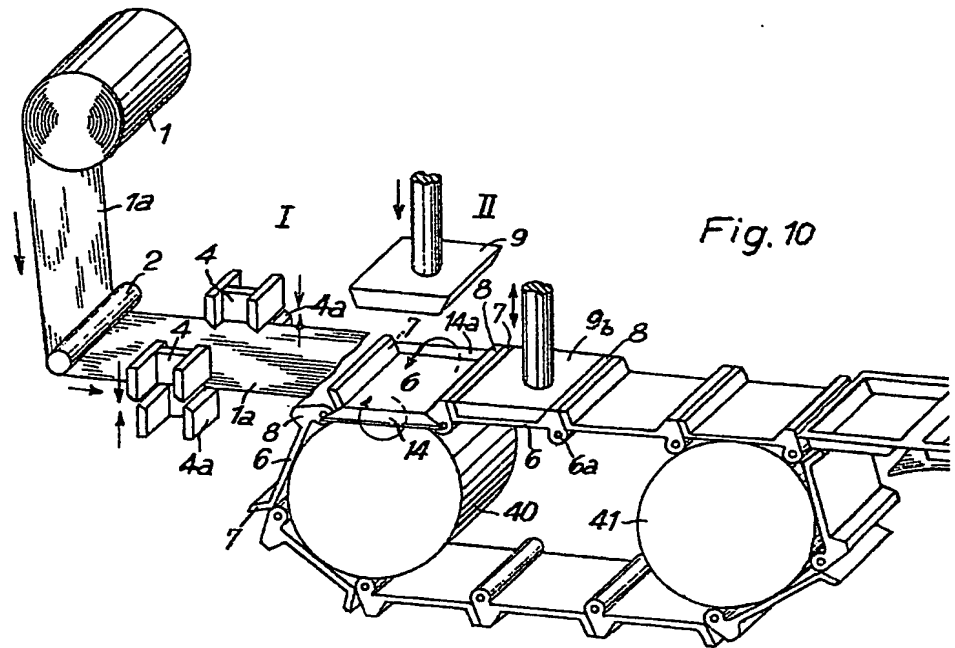


Fig. 13

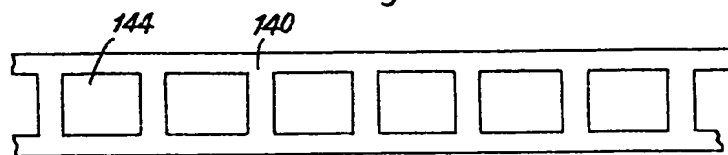


Fig. 10

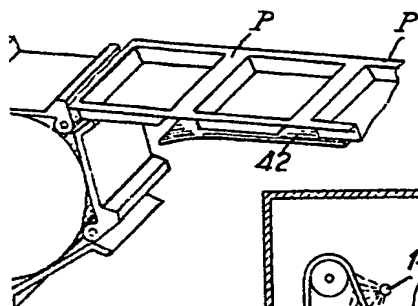
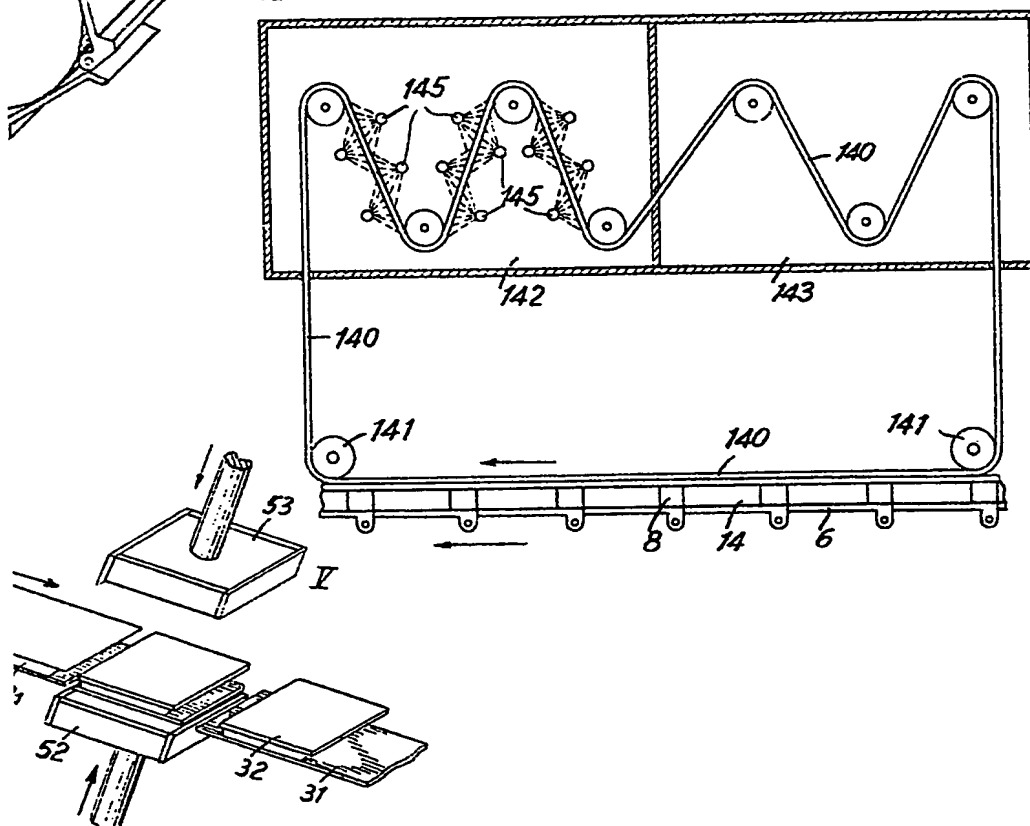


Fig. 12



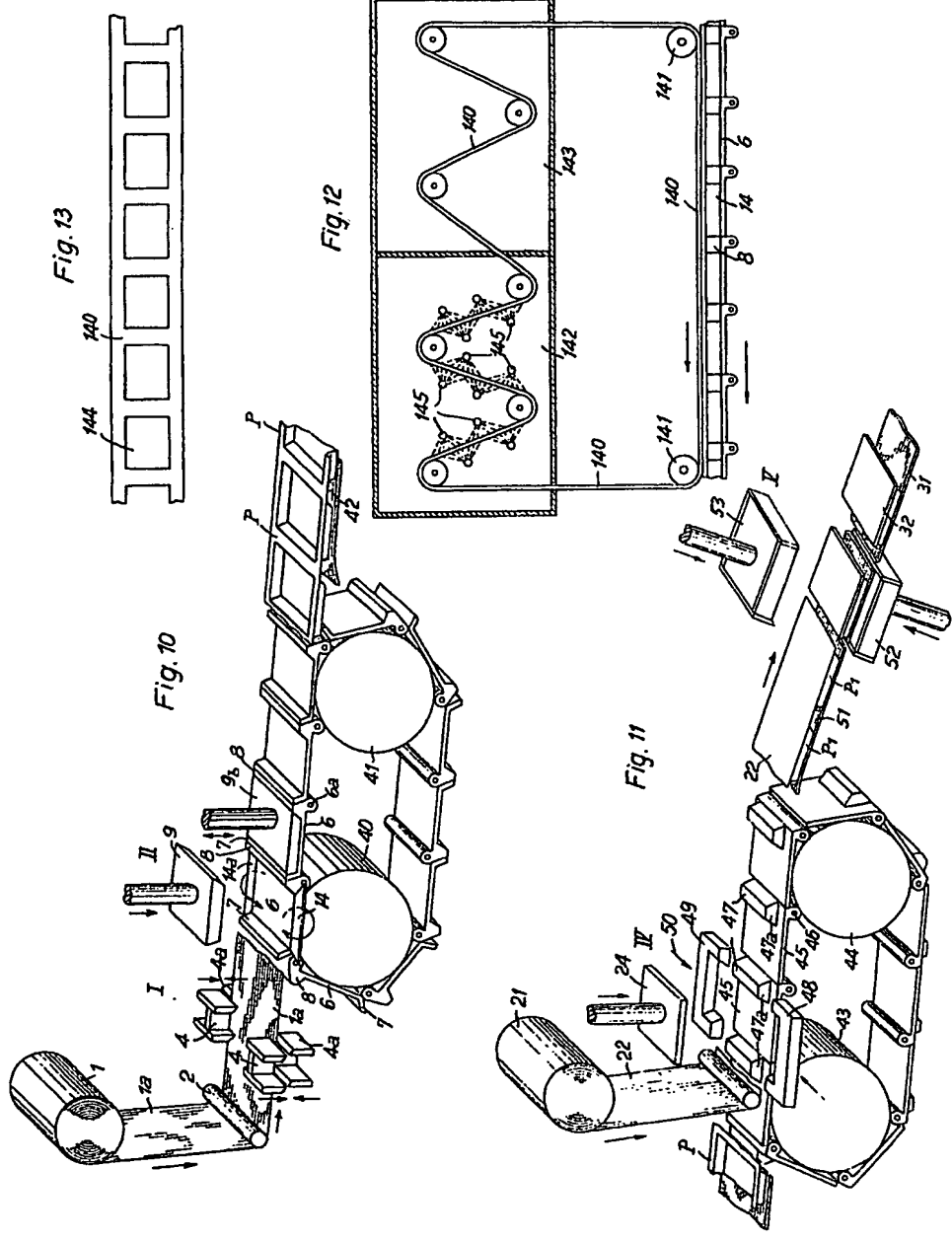


Fig. 14

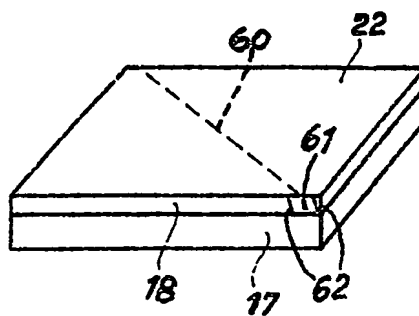
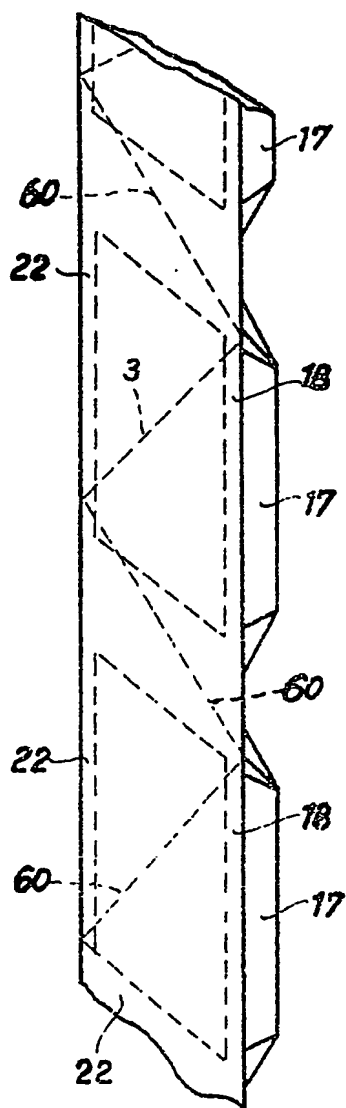


Fig. 15

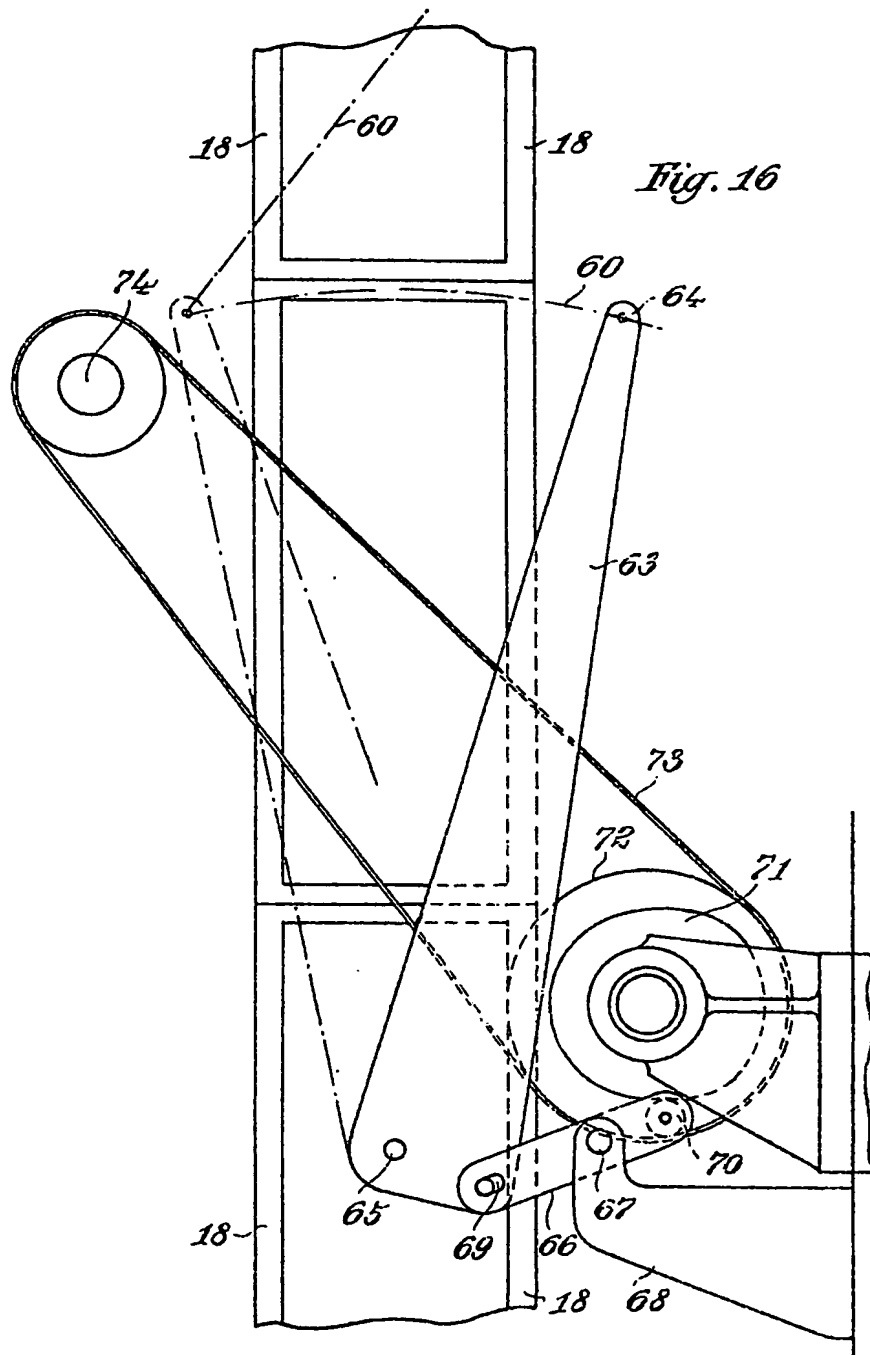


Fig. 14

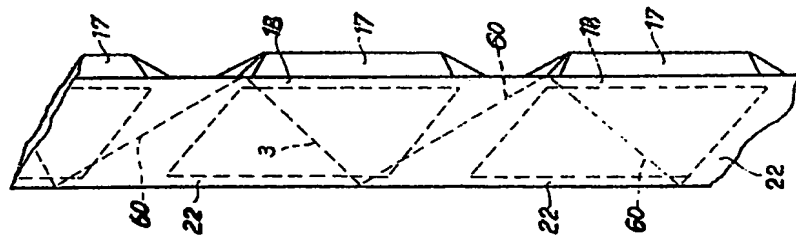


Fig. 15

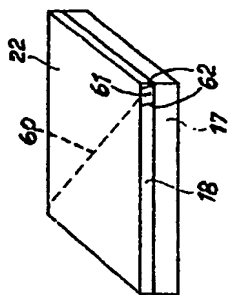


Fig. 16

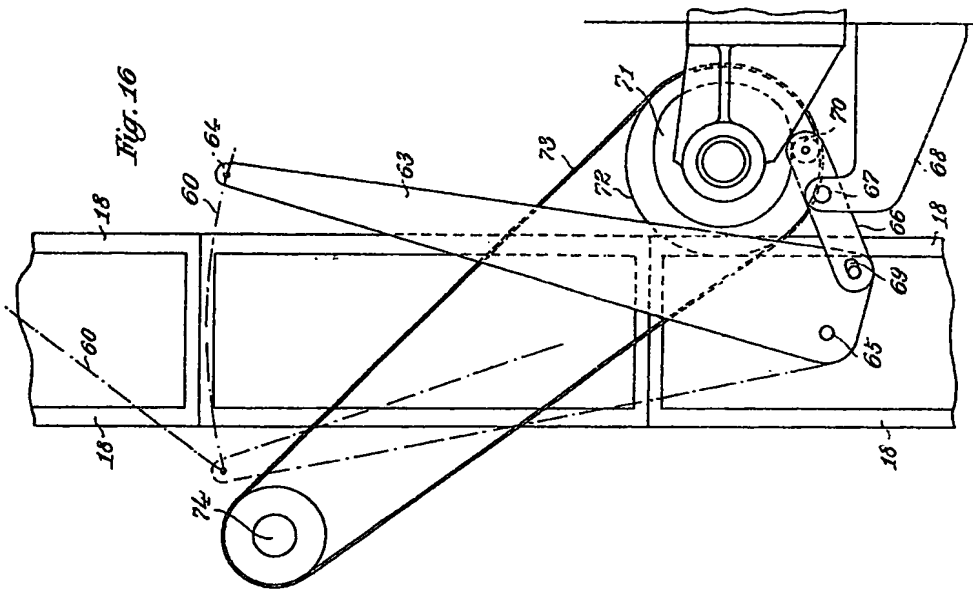


Fig. 17

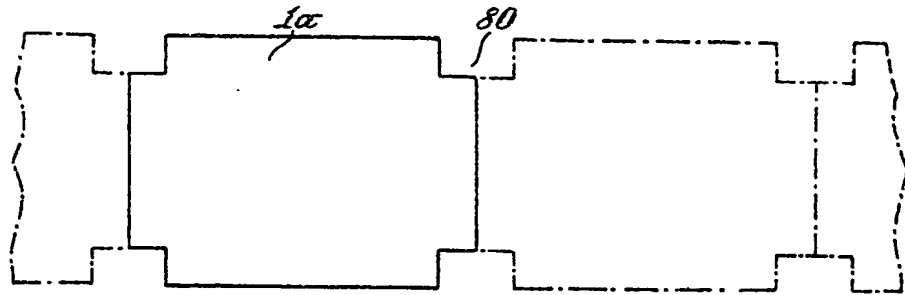


Fig. 18

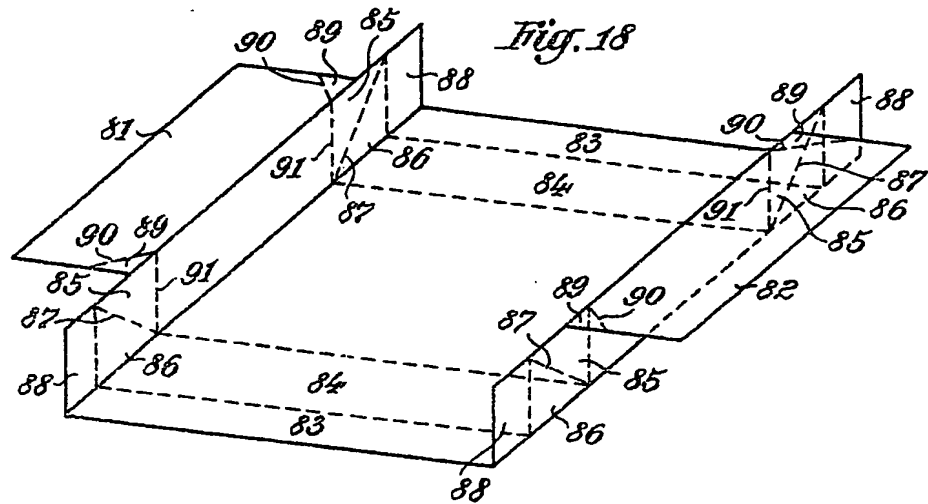
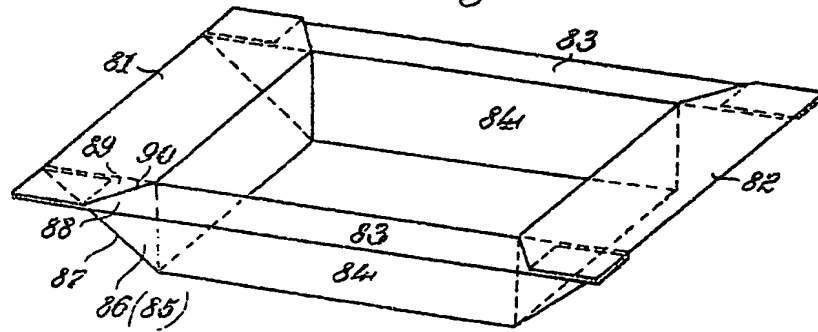


Fig. 19



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6 SHEETS

This drawing is a reproduction of
the Original on a reduced scale.

SHEETS 5 & 6

Fig. 20

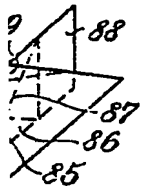
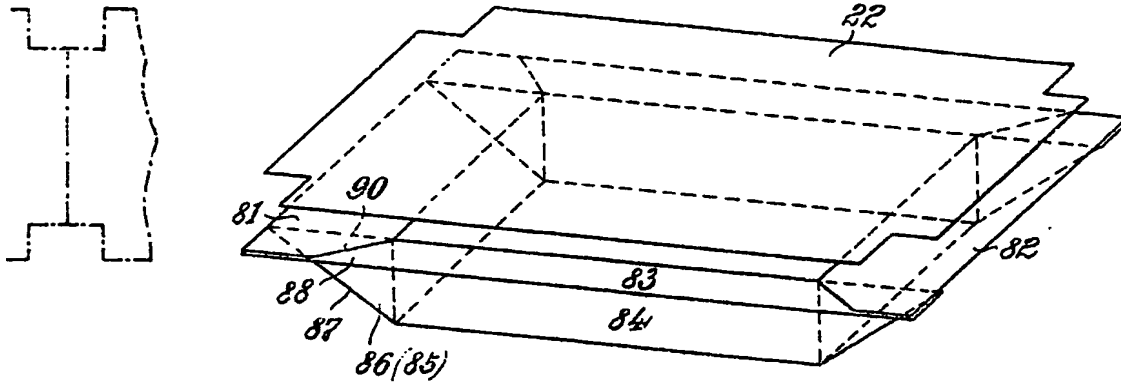


Fig. 21

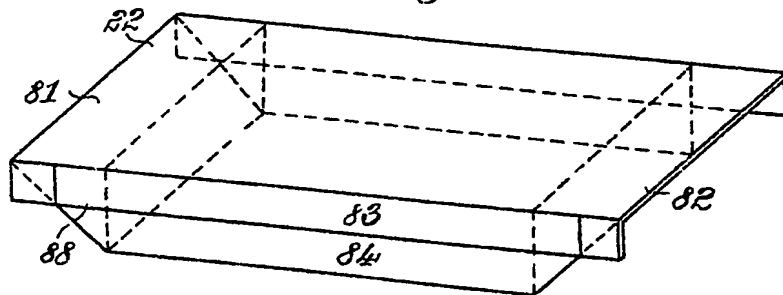


Fig. 22

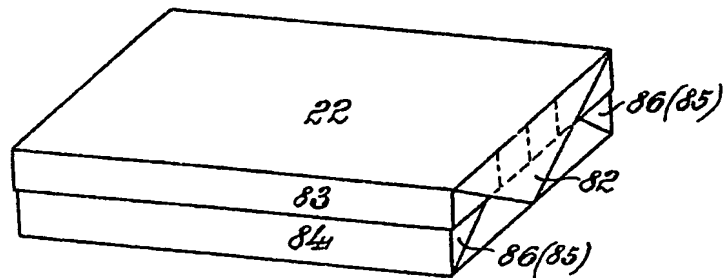


Fig. 17

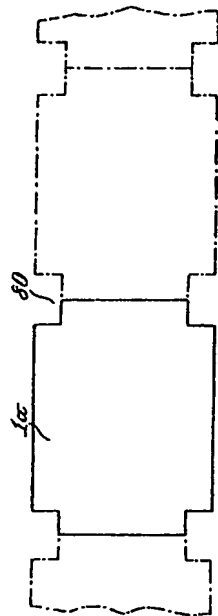


Fig. 20

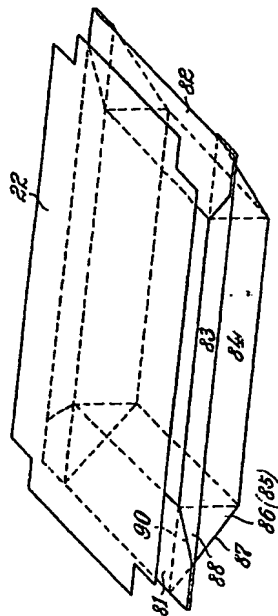


Fig. 18

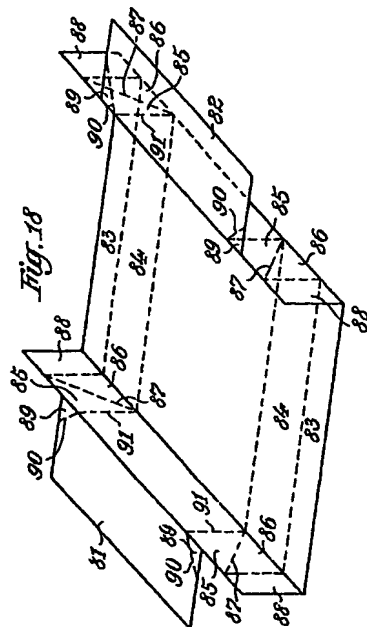


Fig. 21

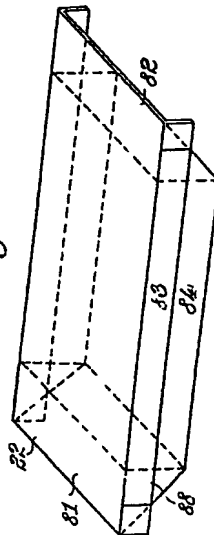


Fig. 19

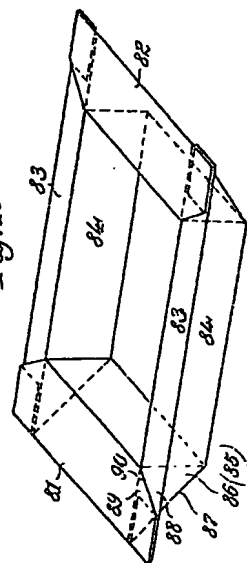


Fig. 22

